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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,134	05/19/2006	Robert Beer	ICH 303-US	9409

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ONOFRIO LAW
107 SHAD ROW
PIERMONT, NY 10968

EXAMINER	
ROBINSON, LAUREN E	
ART UNIT	PAPER NUMBER
1794	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/561,134	BEER ET AL.	
	Examiner	Art Unit	
	LAUREN ROBINSON	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *14-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *14-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/27/2006*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: As disclosed in paragraph 0016 of the applicants' disclosure, they include the phrase "at least one least one". As disclosed, this phrase is not clear and it is the examiner's position that the second "least one" within the phrase is merely a duplication.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 25-26 and 32-33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 25 and 32 are rejected because it is unclear as to whether the tris(8-hydroxyquinoline) aluminum compound was crystallized and then modified as written or whether the applicants intended to claim that the crystalline alumina was modified "by" the tris compound. As written, the claims recite "the crystal modification" of tris(hydroxyquinoline)aluminum and since there is no claim prior reciting said compound being crystallized or modified, then there is no antecedent basis for this limitation.

Claims 26 and 32 are rejected as being dependent on the above rejected claims.

Claims 26 recites the limitation "optical amplifying materials" in claim 12. However, as canceled by the applicants' there is no longer a claim 12 within the set of claims. As such, here is insufficient antecedent basis for this limitation in the claim.

For applying prior art, it is the examiner's position that claim 26 meant to depend on claim 25 and that the "crystal modification of tris(hydroxyquinoline)aluminum" actually meant that the alumina crystal was modified "by" tris(hydroxyquinoline)aluminum.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 14-32 are rejected under 35 U.S.C. 103(a) as being obvious over Kambe et al. in view of Xu et al. (Photoluminescent blue-shift…) as evidenced by Britannica (www.britannica.com), Fused Silica (www.sciner.com) and USByte (www.usbyte.com).

Regarding claim 14, 28 and 31: Kambe et al. teach materials comprised of supports (0068) with layers of polymer-inorganic particle blends applied thereon (0068). The reference teaches that the inorganic particles can be nanoparticles (0129), which can be crystallized (0115) (nanocrystalline). Also, the reference teaches that the nanocrystalline particles can be aluminum oxide crystalline particles (0115) and that the blend layers can be used in optical amplifying materials, laser, flat panel displays, etc. (0070). However, the reference *does not specifically disclose that the alumina*

nanocrystalline particles are nanoporous and that a luminescence layer is applied over the alumina blend layer.

Xu et al. teach porous alumina (Pg. 47, col. 1, par. 1) which is nanoporous (title) and that the surface of the porous alumina was covered by a layer of organic molecular powder (Pg. 47, Col. 2, par. 2). Also, they teach that luminescence is achieved (Pg. 50, col. 1, par. 3) when the organic molecular powder is Alq3 (Pg. 47, Col. 2, par. 3) or RG6 (Pg. 48, col. 1, par. 2). Further, they teach that when disposed on a nanoporous alumina surface made by the method of subjecting an alumina surface to sulfuric acid and/or oxalic acid at room temperature (Pg. 47, col. 2, par. 2 and Pg. 48, col. 1, par. 1), some of the organic particles are present in the surface pores and this allows for strong luminescent (Pg. 50, col. 1, par. 2) which can produce an array to be used in applications such as flat panel displays, etc (Pg. 47, col. 2, par. 1). Also, they teach that the nanoporous alumina layer in combination with one of the above materials allows for high resolution and high uniformity in a display while exhibiting efficient and intense blue-shift photoluminescence and that the above luminescent materials thereon the surface allow for strong re-absorption of porous alumina emission (title, Pg. 47, col. 1, par. 1, Pg. 49, col. 1, par. 1, Pg. 50, col. 1, par. 3 and Pg. 50, col. 2, par. 1). They teach that using the above array, the blue-shift luminescence can occur by the method of preparing the alumina surface as discussed and then after the placement of the luminescent materials thereon, wherein some permeates the surface, the surface can be rinsed with chloroform (Pg. 48, col. 1, par. 2-3).

Kambe et al. and Xu et al. are related due to both teaching an alumina layer used in lasers and displays. Although Kambe et al. does not disclose the applicants' claimed luminescence layer, the reference does disclose that the above material can also be provided and form an interface with one or more optical materials such as materials that emit light at desired frequencies when excited by absorption or electric stimulation (abstract, 0146). The examiner notes that it is known in the art that luminescence is the emission of light when excited by absorption and/or electric stimulation but that relatively few materials have sufficient luminescence efficiency to be of practical value as evidenced by (Britannica). Due to Kambe et al. teaching that optical materials which emit light when subjected to the above conditions can be used and formed with an interface with the above alumina layer, which as evidenced above can be a luminescence material, then it is the examiner's position that one of ordinary skill would recognize that if luminescence was desired in an application for a flat panel display, etc., then they would look to the prior art to find a suitable luminescence material that can form an interface with an alumina layer, and that since it is known in the art that few materials have sufficient luminescence efficiency to be of practical value, it is also the examiner's position that one looking in the prior art would recognize that a luminescence material that can provide sufficient luminescence efficiency to be of practical value in a display device having an alumina layer therein would be desired.

Due to Xu et al. teaching that the luminescence array comprising a nanoporous alumina layer with either Alq3 or RG6 luminescence layer applied thereon made by the method therein provides for blue shift luminescence as well as high resolution, etc. in a

flat panel display device, it is the examiner's position that one of ordinary skill in the art would recognize that when looking in the prior art, that either embodiment of Xu et al. would be advantageous as it produces blue luminescence with high unity, etc. properties to a display and that the luminescence layer embodiments are efficient at providing the above results if the nanocrystalline alumina of Kambe et al. was made nanoporous. As such, it is the examiner's position that it would have been obvious to one of ordinary skill at the time of invention to modify Kambe et al. to include that an optical light emitting material that can be added can be either of the luminescence layers taught by Xu et al. and that the alumina layer can be modified to be nanoporous using methods taught by Xu et al. in order to provide for an efficient and intense luminescence array resulting from the luminescent materials and porous alumina working together, such as strong re-absorption by the luminescence material on the surface, and to also a flat panel display with high resolution, etc. .

Since the layer in Kambe et al. corresponds to the amplification layer composition as claimed by applicants', the examiner notes that the nanocrystalline and nanoporous alumina layer of Kambe et al. acts as an amplification layer **(Claim 14, 28 and 31)**.

Regarding claims 15-16: As discussed and modified, Kambe et al. now teaches the optical amplifying materials as claimed in claim 14. However, the reference is *still silent regarding the alumina in a quantity as claimed in claims 15 and 16.*

Although the amounts of said alumina are not disclosed, the examiner notes that concentration of a material within a layer is a result effective variable as it is known that

by adjusting the amounts the optical and/or physical properties of an article will change. For example, if the quantities of nanocrystals are increased within a film there will be more material therein to reflect and/or absorb light and also since the alumina layer of Kambe et al. also includes polymers that bind the nanocrystals through cross linking (0082-0092), it would be known that by increasing the amount of nanocrystals would also change the amount of bonds that will form to the polymer. Therefore, through routine experimentation of optimizing the quantity of the alumina within the film, one can obtain desired optical and physical results. As such, it would have been obvious to one of ordinary skill at the time of invention to further modify Kambe et al. to include that the amount of nanocrystalline, nanoporous alumina can be optimized to any quantity, including the quantities claimed by the applicants, in order to obtain desired optical and physical results such as level of light absorption, reflection, etc. and/or bonding, etc. within the material **(Claims 15-16)**.

Regarding claims 24 and 27: As discussed, Kambe et al. as modified includes that the optical amplifying material above includes a support, a nanocrystalline and nanoporous alumina layer amplification layer and a luminescence layer of either Alq3 or RG6 can be applied thereon. The examiner notes that Alq3 as identified in the reference of Xu et al., is the compound claimed in the applicants' claimed 24 **(Claim 24)**. Further, Kambe et al. disclose that the support within the reference can be fused silica (0245) and as evidenced by Fused Silica, it is known in the art that the fused silica support corresponds to silica glass (par. 1) **(Claim 27)**.

Regarding claims 17-23 and 29-30: Also, Kambe et al. disclose that the crystalline nanoscale material can be comprised of dopants such as rare earth metal dopants (0116) and these metals can be selected from elements of the periodic table with atomic numbers of from 57-71 (0119). Further, the reference teaches that the polymer within the nanoscale particle blend bond to the particles (binder) (0053, 0211) and that the polymer can be polyvinyl alcohol (0084). The examiner notes that since the polymer forms the layer of the nanoparticle/polymer blend, then the above polymer with binding properties corresponds to a film forming agent. However, the reference is *still silent regarding the actual amount of rare earth metal dopant relative to the alumina or the amount of binder relative to the alumina within the material.*

Although the above amounts are not disclosed, the examiner notes that as discussed, the quantity of a substance within a material is a result effective variable as it is known in the art that by adjusting the amounts of said materials, the optical and/or physical properties will change. For example, in the instant case, since rare earth metals and alumina particles have varying strengths, refractive indices, etc., if the amount of metals relative to the alumina was adjusted, the strength and/or level of reflection, etc. would also change. Also, in reference to the amount of polymer relative to the alumina, due to it being known that the alumina is dispersed within the polymer and thereby bonded to it, if one were to adjust the amounts of each they would know that this adjustment would affect the level of dispersant (viscosity), etc. and through routine experimentation one could obtain desired physical results of the layer.

For the above reasons, the examiner notes that it would have been obvious to one of ordinary skill in the art at the time of invention to further modify Kambe et al. to include that the amounts of polymer and rare earth metal can be optimized to any value, including the values claimed in order to obtain desired physical and/or optical results such as the ones discussed above **(Claims 17-23 and 29-30).**

Regarding claims 25 and 32: As discussed, Kambe et al. as modified now includes the applicants' invention of claims 14 and 28 wherein the surface of the alumina can be prepared by the methods of Xu et al. which can be such methods of using sulfuric acid on the surface, applying Alq3 and then rinsing with chloroform. However, they are still *silent regarding the crystal modification of claims 25 or 32 showing green luminescence*.

While the reference does not specifically disclose green luminescence of green luminescence transformed to blue luminescence, since Kambe et al. as modified includes that the alumina layer and one of the luminescence layers such as Alq3 can be made by the method of Xu et al. to provide for blue-shift luminescence which provides for high resolution, etc., one would recognize from Xu et al. that if produced using the method, that the luminescence array has luminescence at 520nm and then must be rinsed with chloroform to shift to the luminescence wavelength of 488nm (Xu, page. 48, col. 1, par. 3). Therefore, one would recognize that since Kambe et al. uses this same method then the above luminescence transformation will also be present. Further, as evidenced by USByte, the wavelength of 520nm is the green luminescence wavelength and 488nm is the blue. Therefore, through the modification of Kambe et al. by the addition of the luminescence layers above, the luminescence layer on the surface of the

crystals, therefore crystal modification using Alq3 for example, during the beginning of production shows green luminescence and after chloroform rinsing, the green transforms to blue **(Claims 25 and 32)**.

While the reference does not specifically disclose that the green luminescence transforms to blue luminescence at room temperature in the presence of air with daylight, the examiner notes that this is a product by process limitation and although the process may limit the product, the patentability of a product claim is limited by the product itself and not its method of production. Therefore, although the above method of transforming the luminescence from green to blue is different, the examiner notes that the product is the same and therefore, the claim is unpatentable **(Claims 26 and 33)**.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAUREN ROBINSON whose telephone number is (571)270-3474. The examiner can normally be reached on Monday to Thursday 6am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carol Chaney can be reached on 571-2721284. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Lauren E. T. Robinson
Examiner
AU 1794

/LAUREN ROBINSON/
Examiner, Art Unit 1794

/Carol Chaney/
Supervisory Patent Examiner, Art Unit 1794